



NATURAL RESOURCES DEFENSE COUNCIL

March 19, 2007

Hon. John D. Dingell, Chairman
Hon. Rick Boucher, Chairman, Subcommittee on
Energy and Air Quality
Committee on Energy and Commerce
U.S. House of Representatives
2125 Rayburn House Office Building
Washington, DC 20515

Dear Chairman Dingell and Chairman Boucher:

Thank you very much for the invitation to respond to the questions on global warming legislation contained in your letter of February 27, 2007. NRDC's responses to your questions are attached.

NRDC is very supportive of the process you are undertaking and the energy and determination with which you are pursuing it. Enacting legislation to solve global warming before we lock in catastrophic climate changes is NRDC's number one priority.

Our senior staff David Hawkins, David Doniger, and Dan Lashof look forward to working with you and your staff to help develop effective legislation in this Congress that will simultaneously put the nation on the emission reduction pathway needed to prevent the worst global warming impacts, meet other objectives such as reducing our oil dependence, and promote continued strong economic growth.

Sincerely,

Frances G. Beinecke
President

1. *Please outline which issues should be addressed in the Committee's legislation, how you think they should be resolved, and your recommended timetable for Congressional consideration and enactment. For any policy recommendations, please address the impacts you believe the relevant policy would have on:*

- (a) *emissions of greenhouse gases and the rate and consequences of climate change, and*
- (b) *the effects on the U.S. economy, consumer prices, and jobs.*

The recent Intergovernmental Panel on Climate Change (IPCC) report states a new degree of the scientific certainty that global warming is happening now and is human-caused. The IPCC assessment highlights how an increase in global temperatures is already affecting climate worldwide and will have far reaching effects on sea levels, ice cover at the poles, heat waves, floods, and droughts. Here are some of the IPCC's key findings:

- The earth will warm by an additional 4-11 degrees Fahrenheit during the 21st Century if energy production is fossil fuel intensive (best estimate 7 degrees).
- The earth will warm by an addition 3-8 degrees Fahrenheit during the 21st Century if emissions follow a mid-range business-as-usual forecast (best estimate 5 degrees).
- The Arctic Ocean could largely be devoid of sea ice during summer later in the century.
- The ocean will continue to become more acidic due to carbon dioxide emissions. Ocean pH has already decreased by 0.1 units and will decline by an additional 0.14 to 0.35 units if emissions are not curtailed.
- The IPCC projects that sea levels will rise by 7 to 23 inches during the 21st Century, but this estimate assumes no acceleration of ice flow in Greenland or Antarctica and does not fully account for some positive feedback processes, such as the release of additional CO₂ from tundra soils as the planet warms. A new study published in *Science* on January 19th projects that sea levels will rise by 20 to 55 inches this century based on recent observations.¹ This study was published after the deadline for consideration by the IPCC.
- The Stern Review of the economics of climate change, conducted for the UK government, "estimates that if we don't act, the overall costs and risks of climate change will be equivalent to losing at least 5% of global GDP each year, now and

¹ Rahmstorf, S. 2007. "A Semi-Empirical Approach to Projecting Future Sea-Level Rise." *Science* 315:368-370.

forever. If a wider range of risks and impacts is taken into account, the estimates of damage could rise to 20% of GDP or more.”²

At this point, some warming and some impacts are unavoidable, but there is a world of difference between 1 degree and 7 degrees.

Congress needs to enact comprehensive emission limits that will steadily reduce global warming pollution. We still have an opportunity to fix this problem, but only if we act before it's too late.

- **There is a growing consensus that allowing more than a 2 degree Fahrenheit increase above today's global average temperature would have clearly dangerous consequences.**³
- **To retain even a 50-50 chance that average temperatures more than another 2 degrees Fahrenheit in this century, heat-trapping gas and aerosol concentrations need to be stabilized below 450 ppm CO₂-equivalent.**⁴
- **We can stay below 450 ppm CO₂-equivalent if the United States and other industrial nations adopt a declining emissions cap that starts reducing emissions soon and reaches 80 percent below current emission levels by 2050, and if developing countries promptly reduce their emissions growth and follow suit with similar reductions later in the century.**

Because heat-trapping emissions are cumulative, delaying the decision to reduce emissions will only worsen the problem and make the task of solving it much harder. This is illustrated in the two hypothetical emission reduction scenarios for the U.S. presented below. Either scenario, in concert with comparable action by other nations, is

² N. Stern, *et al.*, *The Economics of Climate Change*, p. xv (Cambridge University Press, New York, 2007).

³ Three sources are particularly instructive on the dangers inherent in exceeding a 2 degree Celsius (3.6 degree Fahrenheit) increase over pre-industrial levels, which is equivalent to a 2 degree Fahrenheit increase over today's levels:

- Schellnhuber, H., W. Cramer, N. Nakicenovic, T. Wigley, and G. Yohe, eds. *Avoiding Dangerous Climate Change* (Cambridge University Press, New York, 2006).
- J. Hansen *et al.*, Proceedings of the National Academy of Sciences, **103**:14288 (2006).
- R. Warren, “Solving” *Climate Change: Mitigation Targets and the Earth's Climate System*, presentation to the Center for Clean Air Policy's Climate Policy Initiative Dialogue Meeting, Feb. 13, 2007. Dr. Warren is at the Tyndall Centre for Climate Change Research, University of East Anglia. A copy of Dr. Warren's presentation is attached.

⁴ M. Meinshausen “What Does a 2 C Target Mean for Greenhouse Gas Concentrations? A Brief Analysis Based on Multi-Gas Emission Pathways and Several Climate Sensitivity Uncertainty Estimates.” in H. Schellnhuber, *et al.*, eds. *Avoiding Dangerous Climate Change* (Cambridge University Press, New York, 2006).

aimed at avoiding atmospheric concentrations higher than 450 ppm CO₂-equivalent. But the two scenarios have vastly different economic implications.

If national emission reductions start soon, we can stay on the 450 ppm path with an annual emission reduction rate that gradually ramps up to 3.2% per year. But if we delay a serious start by, for example, 20 years and allow continued emission growth at nearly the business-as-usual rate, the annual emission reduction rate required to stay on this path jumps to 8.2% per year (see Figure 1). In short, a slow start forces a crash finish.

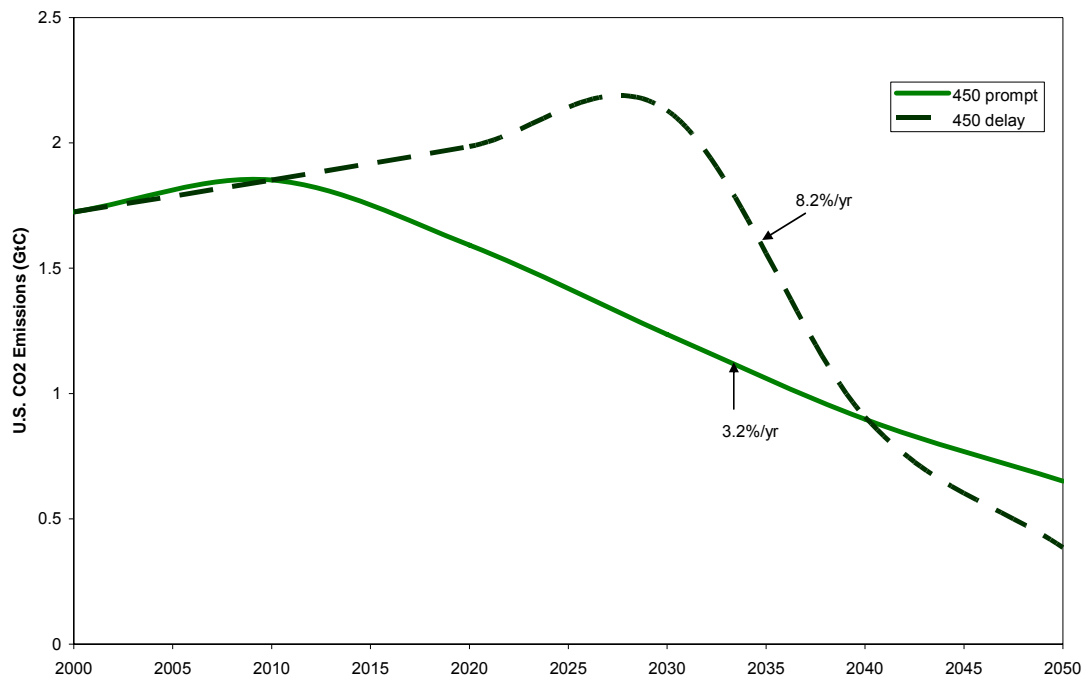


Figure 1: Prompt start and delay pathways consistent with stabilizing heat-trapping gases at 450 ppm CO₂-equivalent. Global emissions 2000-2100 are 480 GtC from Meinshausen's S450Ce scenario (*see fn. 2, above*). The U.S. share of global emissions is assumed to decline from 25% to 5% linearly between 2000 and 2100. This results in an emissions budget for the U.S. of 84 GtC in the 21st Century. In the prompt start case emissions decline by 1.5%/yr from 2010 to 2020, 2.5%/yr from 2020 to 2030 and 3.2%/yr thereafter. The delay case assumes that emissions grow by 0.7%/yr from 2010 to 2030, a reduction of 0.5%/yr compared to the Energy Information Administration forecast;⁵ emissions must decline by 8.2%/yr thereafter to limit cumulative 21st Century emissions to 84 GtC. Cumulative emissions 2000-2050 are 68 GtC in the prompt start scenario and 79 GtC in the slow start scenario.

Some analysts argue that delay is cheaper because we will develop breakthrough technologies in the interim. But that outcome is implausible for three reasons.

- First, delay dramatically increases the emission reduction rate required later. Cutting emissions by more than 8 percent per year would require deploying advanced low-

⁵ Reference case from U.S. Department of Energy, Annual Energy Outlook 2006 with Projections to 2030, Report # DOE/EIA-0383(2006).

emission technologies several times faster than conventional technologies have been deployed over recent decades.⁶

- Second, without meaningful near-term market signals, there will be little incentive for the private sector to direct significant R&D resources toward developing the breakthrough technologies. Hope will rest entirely on the federal R&D program, which now is far too small to yield the required results.
- Third, without different market signals, a new generation of conventional power plants, vehicles, and other infrastructure will be built during the next two decades. Our children and grandchildren will then have to bear the costs of prematurely retiring an even bigger stock of highly-emitting capital than exists today. Even with a substantial discount rate, it is virtually impossible that delaying emission reductions will be cheaper than starting now.

The Stern Review concludes: “The costs of stabilising the climate are significant but manageable; delay would be dangerous and much more costly.” Where the impacts of unabated climate change could cost 5%, or even 20% of world GDP, the Stern review concludes that achieving a declining cap ultimately reaching an 80% reduction below current emission levels “is a major challenge, but sustained long-term action can achieve it at costs that are low in comparison to the risks of inaction.”⁷

Stern estimates the cost of achieving stabilisation between 500 and 550 ppm CO₂ equivalent at “around 1% of global GDP, if we start to take strong action now.”⁸ Achieving the more demanding target of 450 ppm is still within our reach. Its costs would still compare favorably to the prospect of climate change impacts costing us 5-20% of world GDP.

Thus the “slow start” scenario has shortcomings from both the environmental and business perspectives. From the climate protection standpoint, it risks locking us into dangerous CO₂ concentrations. From the business standpoint, it provides neither economic nor political certainty, and it leads to higher costs later.

Thus, we need legislation that will reduce global warming emissions on a sufficient scale and still meet the legitimate economic concerns of industries and other constituencies. The key elements of this legislation include:

- **A prompt start and long-term declining cap.**

⁶ Hawkins, D. “Policies to Promote Carbon-less Energy Systems” *Proceedings of the 7th International Conference on Greenhouse Gas Control. Technologies (GHGT7)*. September 5-9, 2004, Vancouver, Canada.

⁷ Stern Report, *supra* note 2, at p. xvi.

⁸ *Id.*

- **A new approach to controlling unexpected costs.**
- **Strategic use of allowances to cut program costs through energy efficiency, promote new technologies, and assure a just transition for affected communities and workers.**
- **Complementary standards and incentives that will drive investment in energy efficiency, advanced fuels and vehicles and carbon capture and storage.**

These elements are discussed in response to subsequent questions.

2. *One particular policy option that has received a substantial amount of attention and analysis is “cap-and-trade.” Please answer the following questions regarding the potential enactment of a cap-and-trade policy:*

(a) *Which sectors should it cover? Should some sectors be phased-in over time?*

NRDC supports legislation to establish an economy-wide cap-and-trade program together with complimentary performance standards that will help reduce costs and assure the early deployment of technologies needed to make emission reductions on the necessary scale over the coming decades.

The cap-and-trade program should cover all sectors of the economy that contribute significantly to global warming pollution. These include:

- electric power generation,
- transportation,
- other major emitting sources (categories and individual sources above an emissions threshold), and
- natural gas distribution.

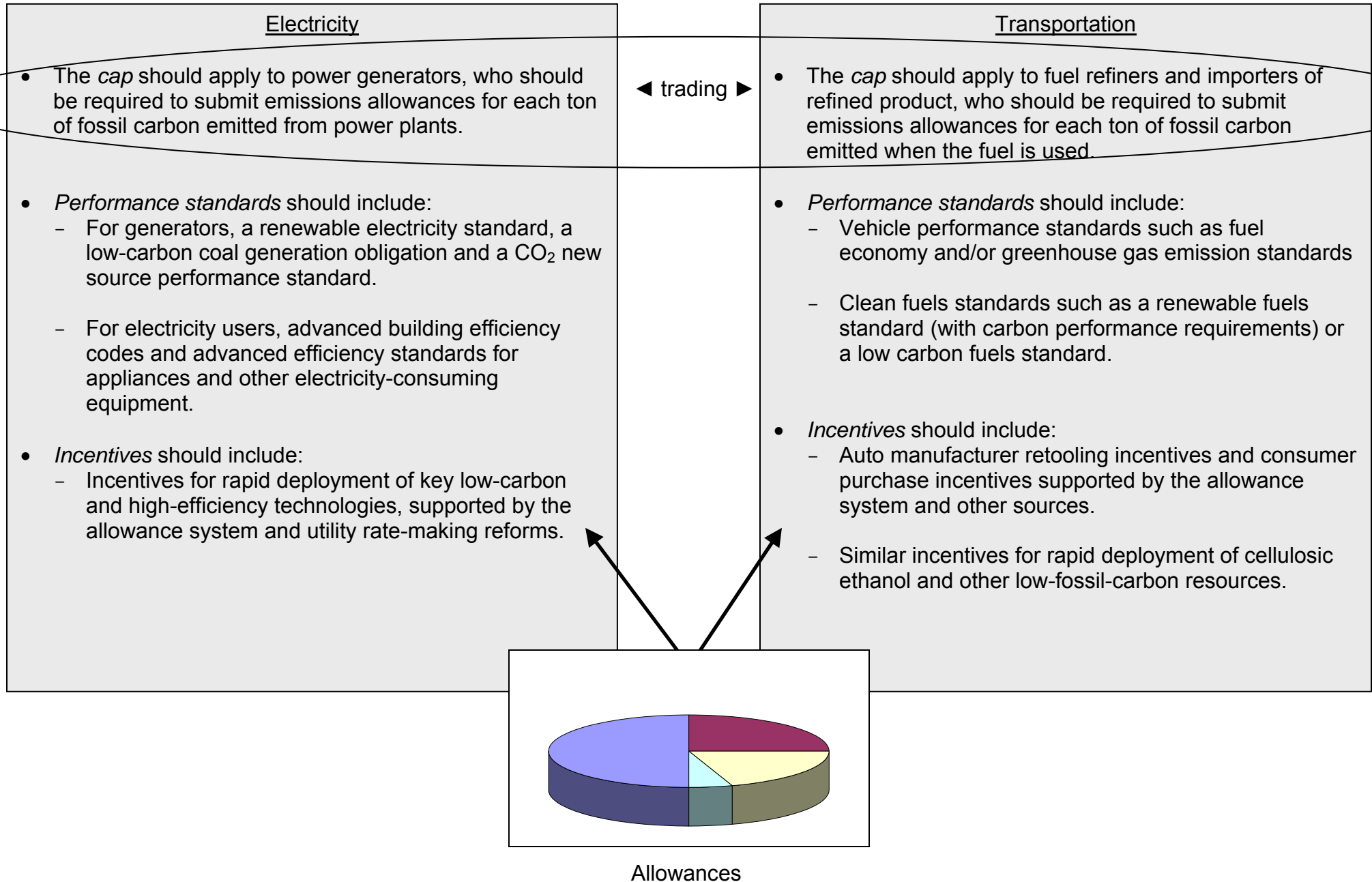
Together, these sectors account for more than 80% of U.S. emissions.

All of these sectors should be included in the legislation from the beginning and should be subject to controls on the same effective date. (The program should cover carbon dioxide, methane, nitrous oxide, and high-GWP gases including hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride, as discussed below.)

It is essential to have a hybrid program that combines the “cap-and-trade” system with performance-based standards and incentives. Performance-based standards, in combination with complementary incentive policies, can reduce costs and accelerate the deployment of needed technologies. These additional policies – performance standards and incentives – should be targeted at key low-emitting and energy-efficient technologies. Without such policies, the cap-and-trade system alone runs the risk of producing unnecessarily high allowance prices and inadequate technological progress in key sectors, especially in the near- and mid-term.

Two examples illustrating this structural combination are set forth in Figure 2. Of course, this two-sector figure is incomplete. A full economy-wide program should include all the other sectors and sources identified above.

Figure 2



Why standards and incentives are needed: electricity and transportation examples

Legislation that combines a cap-and-trade program with standards and incentives will achieve lower costs for consumers and society as a whole than a cap-and-trade program alone. A combined program will more quickly and fully capture existing cost-effective opportunities for low-carbon technologies, especially energy efficiency. A combined program also offers the opportunity to help key industries transition to new technologies much more quickly than under a cap-and-trade program alone.

For example, decades of experience and research in the electricity sector in California and other states demonstrate that targeted standards for appliances, cooling systems, light-bulbs, and other electricity-intensive equipment are effective in lifting the efficiency of product lines rapidly and cost-effectively – much more quickly than by relying on electricity price signals alone. Likewise, incentives such as purchase rebates and smart marketing programs can be extremely effective in moving these products into homes and businesses much more rapidly than in response to electricity prices alone.

The result is lower electricity demand (California's per capita electricity demand has been held roughly constant for three decades), less need for new expensive electricity supplies, and large consumer and system-wide savings. Under a cap-and-trade system, these programs reduce the cost of meeting the cap, by reducing amount of generation necessary, and lowering allowance prices.

- It is well established in the field of large consumer appliances such as heating and cooling systems and refrigerators that market barriers exist to the rapid uptake of energy efficiency technologies into the market. On the basis of these well-understood problems, many states and the federal government have adopted efficiency standards and incentives for appliances and buildings.
- An excellent example of the effectiveness of electricity sector performance standards at the federal level are appliance and equipment standards. According to the American Council for an Energy Efficient Economy (ACEEE), these standards will reduce carbon emissions by 86 million metric tons per year in 2020.⁹ These reductions will at the same time save consumers about \$230 billion by 2030, which is equivalent to approximately \$2,200 per household.
- An energy efficiency resource standard (EERS) should be adopted as a part of a cap-and-trade program. An EERS is a market-based mechanism that would require both electric and natural gas utilities to save a certain percentage of their energy sales each year through energy efficiency. According to ACEEE, an EERS that ramps up to

⁹ Nadel, Steve, *et al.*, "Leading the Way: Continued Opportunities for New State Appliance and Equipment Efficiency Standards," pp. 9-10, American Council for an Energy Efficient Economy and Appliance Standards Awareness Project, March 2006.

0.75% of sales per year would by 2020 reduce carbon emissions by about 87 MMT per year and have saved consumers and businesses a total of approximately \$64 billion.¹⁰

The same opportunities exist in the transportation sector. Many studies show that higher performance standards – expressed in terms of fuel economy or GHG emissions – would save consumers money, taking into account lifetime fuel savings. Focusing on combined monthly payment for leasing a vehicle and paying for fuel, these vehicles are cheaper to own and operate.

- Based on a recent EPA study on vehicle technologies, NRDC estimates that when fuel savings are included, the cost of controlling carbon from vehicles is *minus* \$43 to *minus* \$94/metric ton of CO₂ for midsize cars, and *minus* \$86 to *minus* \$126/metric ton of CO₂ and for large SUVs.¹¹

If the sole tool employed to address global warming in the transportation sector were a cap-and-trade program at the oil refiner level, fuel prices would rise to reflect the cost of carbon allowances. But because of market barriers to rapid penetration of improved vehicle technologies, consumers would end up paying higher prices per gallon and higher total fuel bills than necessary.

The market for passenger vehicles reflects the same barriers that affect large consumer appliances and equipment in the electricity field. Despite clear calculations of net consumer welfare, consumers are slow to trade in old fuel-inefficient vehicles for newer efficient ones. Likewise, manufacturers are slow to change their product lines. Last year NHTSA recognized the existence of market barriers as a reason for raising fuel economy standards for light trucks. That is why there is a strong continuing role for vehicle performance standards under a cap-and-trade system.

Historically, auto industry resistance to higher efficiency standards has reflected the belief that – at least under current industry marketing and financing approaches and current consumer behavior – automakers are not able to capture a sufficient share of lower consumer operating cost in the price of more efficient vehicles. We can fix this problem by combining the cap-and-trade system with performance standards and incentives funded by the allowance system to change the market more quickly.

¹⁰ Nadel, Steve, “Energy Efficiency Resource Standards: Experience and Recommendations,” p. 39, American Council for an Energy Efficient Economy, March 2006.

¹¹ EPA, *New Powertrain Technologies and Their Projected Costs: Interim Report*, www.epa.gov/otaq/technology (Oct. 2005). The California Air Resources Board reached the same conclusion regarding the consumer savings from its greenhouse gas emission standards.

These standard and incentives will reduce the societal cost of meeting the cap, will put money in consumers' pockets, and will prime the pump for manufacturers to retool their factories and product lines.

Performance-based standards and complementary incentives are necessary to achieve other important goals, such as reducing the nation's dangerous petroleum dependency. One recent assessment estimated that oil carries a \$5-\$25 per barrel (12 to 60 cents per gallon) extra cost in terms of national security, economic security, and environmental harms other than climate change.¹²

¹² Parry, Ian, "The Case for a Pay-By-the-Barrel Oil Tax," *Resources* 163, Fall 2006.

(b) To what degree should the details be set in statute by Congress or delegated to another entity?

NRDC believes Congress needs to set the major elements and details of the program into the statute. As a general rule, the acid rain title of the Clean Air Act was very successful because the key decisions on coverage, the size of the cap, the allowance allocation, and the monitoring requirements were made by Congress. Even matters delegated to EPA for rulemaking had relatively clear legislative guidance. Legislative specificity leads to clearer market signals and more certainty for interested parties, more efficient and timely implementation, and less litigation.

NRDC believes the new legislation should take the form of amendments to the Clean Air Act, and should assign administration of the program to the Environmental Protection Administration. Proceeding in this way will simplify the legislative task, because it takes advantage of many tried-and-true underlying components of the current Clean Air Act that do not have to be recreated in a new statute (e.g., definitions, administrative procedures, public information provisions, enforcement procedures, citizen suits). The EPA also has the most experience administering market-based emissions regulation and emissions performance requirements.

That is not to say that Congress should follow the acid rain title or other current Clean Air Act provisions in all respects. There are important lessons learned from that program and important differences between acid rain and global warming that call for different approaches in some areas.

(c) *Should the program's requirements be imposed upstream or downstream or some combination thereof?*

As explained above (sub-question (a)), NRDC believes the statute needs to establish both an emissions cap-and-trade program, and complementary policies for efficiency and technology deployment. Those complementary policies are discussed further in response to later sub-questions.

We interpret sub-question (c) as pertaining to the cap itself. On this, NRDC supports a hybrid, applying to a mixture of direct emitters and upstream producers and distributors of fuels or other covered chemicals.

The principles we urge the Congress to apply are that (1) the cap should cover direct emitters, except (2) where direct emitters are very numerous and individually small, it make sense to move up the supply chain to cover larger entities for the emissions from the use of the fuels (or chemicals) they distribute. Large direct emitters have more control over their choice of technologies than do mine-mouth or well-head fuel providers. In other areas, however, oil refiners, natural gas distributors, and chemical producers are the most efficient point for cap coverage. Specifically:

- For electricity, the cap should apply at the point of electricity generation, and thereby be integrated with current cap-and-trade and emission control requirements applicable to electric generators.
- For major industrial and commercial emitters, the cap should apply to all sources that emit a threshold amount (e.g., 10,000 metric tons) of CO₂-equivalent.
- For transportation, the cap should apply at the point of refiners or importers of refined product.
- For natural gas and oil not used by electric generators or major sources, the cap should apply at the point of natural gas distributors and oil refiners.
- For high-GWP gases such as hydrofluorocarbons, the cap should apply to chemical producers and importers. Like oil refiners, they should be required to submit allowances for the emissions that will occur downstream from products using these materials. This is the same approach used under Title VI of the current Clean Air Act, which regulates the production and import of ozone-depleting substances.

- (d) *How should allowances be allocated? By whom? What percentage of the allowances, if any, should be auctioned? Should non-emitting sources, such as nuclear plants, be given allowances?*

Pollution allowances are a public trust. They represent permission to use the atmosphere, which belongs to all of us, to dispose of global warming pollution. The capacity of the atmosphere to absorb carbon is extremely limited. This limited carrying capacity is not a private resource owned by historical emitters. Private entities should not have a right to dump harmful pollution in the public's atmosphere for free.

Emissions allowances will be worth tens of billions of dollars per year, and their value will increase over the first decades of the program as the pollution cap declines. Providing more than a small fraction of the allowances for free to pollution sources would give their shareholders an enormous and undeserved financial windfall. Economics dictate that most firms will raise their prices to reflect the market value of these allowances, passing that cost onto consumers even if the allowances were received for free.

For these reasons, NRDC opposes grandfathering of emissions allowances to firms based on historical emissions, heat input, fuel sales, or other factors. Grandfathering the allowances would generate huge windfalls and transfers of wealth. Economists at the Congressional Budget Office, Resources for the Future (RFF) and other institutions have determined that grandfathering all emissions allowances would give the recipient companies an asset worth *seven times* the costs that they could not pass on to energy consumers. Those companies would become billions of dollars wealthier at consumer expense.

Stanford University and RFF economist Larry Goulder has shown that in an economy-wide upstream cap and trade program, it would require only 13% of the allowances to cover the costs that fossil-fuel providers would not be able to pass on to consumers.¹³ Dallas Burtraw and RFF colleagues have shown similar results for a cap and trade program on electricity generators.¹⁴ The Congressional Budget Office has reached the same conclusion.¹⁵ In the United Kingdom, the government has determined that free

¹³ Morgenstern et al., "The Distributional Impacts of Carbon Mitigation Policies," Issue Brief 02-03 (Resources for the Future, Feb. 2002), <http://www.rff.org/Documents/RFF-IB-02-03.pdf>.

¹⁴ Morgenstern et al., *supra*.

¹⁵ See e.g., Terry Dinan, "Shifting the Cost Burden of a Carbon Cap-and-Trade Program," (Congressional Budget Office, July 2003); CBO, "Issues in the Design of a Cap-and-Trade Program for Carbon Emissions," (Nov. 25, 2003).

allocation of allowances to electric generators has resulted in windfall profits of over \$500 billion.¹⁶ Congress should not repeat this mistake.

Claims that regulated industries deserve allowances for free ignore the fact that they can pass on most program costs to consumers. Even compensating them for the limited costs they cannot pass on is really a quite extraordinary concept that runs against our deeply rooted legal tradition that industry should bear the responsibility for the harms done by releasing dangerous pollution. Complying with pollution control laws and regulations is part of the cost of doing business. Some of this cost can be passed on to consumers. But that portion which cannot be passed on is properly absorbed by company shareholders.

To avoid these windfalls, allowances should be held in trust for the public and distributed in ways that will produce public benefits.

This can be done through an auction, with the revenue dispersed according to legislated formulae and criteria, or by distributing the allowances themselves according to the same formulae and criteria. In either approach, the legislation should provide for a public trustee (like the Climate Change Credit Corporation proposed the Olver-Gilchrest bill (H.R. 620)) to administer the allowances.

The overarching goals should be (1) to keep the cost of the program as low as possible for residential, commercial and industrial consumers (especially low-income consumers), by encouraging investment in end-use energy efficiency measures and by avoiding wealth transfers from consumers to upstream entities, and (2) to encourage deployment of the technologies needed to significantly reduce emissions in key sectors (e.g., mainstreaming carbon capture and disposal in the electric sector; retooling the auto industry to produce hybrids and other low-emitting vehicles; accelerating deployment of sustainable low-carbon motor fuels and renewable electricity).

NRDC believes the allowance resources should be used for four broad objectives (see Figure 3):

- (1) To reduce overall costs for individual and business consumers (especially low-income consumers) through energy efficiency investments (50%).**
- (2) To accelerate deployment of the “big change” technologies that we will need to cut emissions in key sectors (25%).**
- (3) To provide transition assistance to impacted workers and heavily affected firms, and adaptation assistance to communities, farmers, wildlife managers (20%).**

¹⁶ House of Commons, Environmental Audit Committee, “The International Problem of Climate Change: UK Leadership in the G8 and EU,” p. 17 (Mar. 16, 2005).

(4) To encourage carbon reductions outside the cap, and early reductions, while preserving the cap (5%).

These objectives are illustrated in Figures 2 and 3 and elaborated below.

(1) 50% of allowances to support cost-saving energy efficiency investments

As shown in Figures 2 and 3, NRDC proposes that *at least half* of total allowances should be allocated for the benefit of energy consumers, primarily to facilitate investments in using energy more efficiently.

These investments will help reduce overall energy demand without any sacrifice in the quality of energy services. They will tangibly reduce consumers' energy bills and they will substantially reduce the overall cost of a cap-and-trade program.

Despite these clear balance-sheet advantages, individual consumers under-invest in end-use efficiency, resulting in higher energy costs and higher emissions. Energy efficiency programs have a proven track record of overcoming the market barriers that cause this under-investment. Allowances should be used to fund such programs on a much larger scale nationwide than ever before.

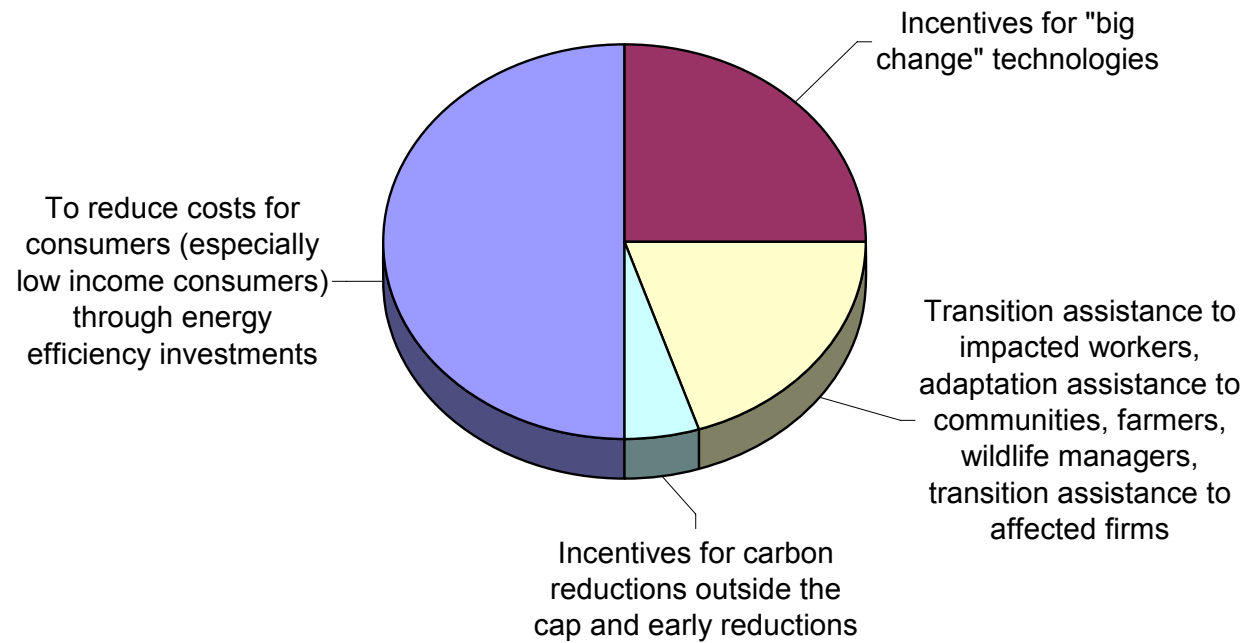
Energy efficiency programs supported by allowance allocations should be aimed at both businesses and individual users of energy, with an emphasis on low-income individuals. These programs should promote efficiency in electricity and natural gas use, and in transportation.

Electricity and natural gas. An analysis conducted for the northeast states' Regional Greenhouse Gas Initiative (RGGI) indicates that increasing end-use efficiency is the most effective way to reduce the impact of a carbon cap on electricity rates.¹⁷ Indeed, this analysis demonstrated that by using the proceeds of an allowance auction to promote efficiency, the states could reduce power sector carbon dioxide emissions by 10% from current levels and at the same time save average customers over \$100 per year on their energy bills.¹⁸

¹⁷ ICF Consulting "RGGI Electricity Sector Modeling Results, Updated Reference, RGGI Package and Sensitivities," September 21, 2005, available at http://www.rggi.org/docs/ipm_modeling_results_9_21_05.ppt; Economic Development Research Group, "Economic Impacts of RGGI Under Proposed SWG Package Scenarios," September 21, 2005 available at http://www.rggi.org/docs/remi_stakeholder_presentation_11_17_05-final.ppt#492,1.

¹⁸ Economic Development Research Group, "Economic Impacts of RGGI Under Proposed SWG Package Scenarios," September 21, 2005.

Figure 3: Allowance Allocation



A study by the American Council for an Energy Efficiency Economy demonstrated even more dramatic results in the natural gas sector – increasing energy efficiency by 5% could reduce natural gas prices by 20%.¹⁹ Since natural gas-fired electricity generation is at the margin in many regions, increasing the efficiency of natural gas use in non-electric applications will reduce the impact of a carbon cap on both gas prices and electricity rates.

In Appendix 1, NRDC offers a specific proposal to assist electricity consumers by giving these energy-efficiency/consumer-benefit allowances to *electricity distribution companies*, with enforceable requirements to use the market value of those allowances (1) to fund end-use efficiency investments, and (2) to fund energy price impact assistance to low-income consumers. The same proposal would apply to *natural gas distribution companies*. As explained in Appendix 1, this proposal also provides a simple uniform solution to the fact that electricity and natural gas services are rate-regulated in some jurisdictions and competitive in others.

Transportation. The California Air Resources Board and the National Academy of Sciences have demonstrated the same effect in the motor vehicle sector: Standards to limit global warming emissions or raise fuel economy can provide consumers a net savings through lower fuel and maintenance costs that more than offset higher costs for new vehicles. Improving the efficiency of the vehicle fleet will also help moderate gasoline prices by reducing overall gasoline demand.

Yet there are significant market barriers here too that stand in the way of reaping the full potential benefit of more efficient transportation. To help overcome these barriers, NRDC proposes to use allowances to fund much larger consumer purchase incentives for low-emitting vehicles than government has ever before provided. (These consumer incentives would dovetail with manufacturer retooling incentives.) There are many ways such incentives could be delivered to consumers, and we welcome to discuss these options in greater detail.

(2) 25% of allowances for “big change” technology incentives

In order to prevent dangerous global warming it is essential to start making reductions in heat-trapping pollution now and to get on a path toward reducing emissions by 80 percent by mid-century. To accomplish this at reasonable cost, many analyses demonstrate the need for rapid deployment of clean and low-emitting energy technologies in key sectors – especially electricity and transportation, which together make up more than two-thirds of

¹⁹ Elliott, Neal R, Anna Monis Shipley, Steve Nadel and Elizabeth Brown, “Impacts of Energy Efficiency and Renewable Energy on Natural Gas Markets,” American Council for an Energy Efficient Economy, September 12, 2003.

U.S. global warming emissions. Although not an exclusive list, the prime candidate “big change” technologies include:

- Drive-train and related technologies (including hybrid gas-electric engines) in the auto industry;
- Carbon capture and disposal in the electric sector; and
- Renewable electricity and sustainable low-carbon fuels for transportation.

But we face a serious dilemma. We need to start rapid deployment of these “big change” technologies *now* in order to hold down the long-term costs of sharply cutting U.S. emissions, yet it is generally agreed that the initial price signals from feasible cap-and-trade programs will not be sufficient alone to jump-start that deployment. The allowance distribution formula can solve this problem, by incentivizing firms to invest in rapid deployment of these key technologies.

For example, CCS deployment requires about \$2 billion/yr in investment on a levelized cost basis. A University of Michigan study for NCEP estimates that capital investments of \$153 million are required for capacity to produce 200,000 hybrids per year (not including engineering costs).²⁰ This report shows the long-term cost savings, through job retention, of providing incentives to automotive manufacturers and suppliers to re-tool their existing plants to make in the United States hybrid and advanced diesel engines and components that would otherwise be produced offshore.

Funds on this scale for these and other technologies will not be found through tax incentives or appropriations. The allowance distribution formula can solve this problem, by incentivizing firms to invest in rapid deployment of these key technologies.

NRDC proposes to dedicate at least 25 percent of total allowances to incentivize technology deployment and R&D. Although not an exclusive list, the prime candidate “big change” technologies include:

- *Retooling the automobile.* A wide range of improved drive-train technologies, including hybrid gas-electric engines, clean diesels, batteries, fuel cells, and related technologies, are available to dramatically reduce global warming pollution from passenger vehicles and, by extension, many other segments of the transportation sector.

Incentivizing domestic production of these technologies would assist domestic auto companies in becoming more competitive. An allowance allocation to automakers

²⁰ “Fuel-Saving Technologies and Facility Conversion: Costs, Benefits and Incentives,” Office for the Study of Automotive Transportation, University of Michigan, November 2004.

(and suppliers), coupled with steadily improving performance standards for lower global warming emissions or higher fuel economy would help incentivize and smooth the transition to building advanced, clean technologies. Similarly, allowances could be used to support consumer incentives to purchase clean vehicles at many times the scale of today's tax breaks for hybrids.

- *Carbon capture and disposal (CCD) in the electric sector.* All the components of a comprehensive CCD system rely on proven technologies. CCD is essential if coal is to maintain a vibrant market under a long-term declining cap. Large-scale implementation of CCD in this country would open the door to its application in China and India as well – a key to sustaining development in those nations without unacceptable carbon emissions.

Despite these factors, investment in CCD is currently limited by two factors. First, many electric generators that see the attractiveness of this technology are waiting for others to undertake the first projects. Second, beyond initial applications associated with enhanced oil recovery, there is a cost differential (compared to conventional coal plants) that is unlikely to be covered by initial allowance prices.

During this period, incentives in the form of allowance allocations can accelerate the deployment of CCS in meaningful numbers. As indicated above, these incentives should be coupled with an emissions performance standard – e.g., a low-carbon emissions standard for coal-based energy. All coal-based electric generation technologies should be allowed to compete as long as they meet a common CCD performance standard.

- *Renewable electricity and sustainable low-carbon fuels.* A third “big change” technology is renewable energy, both in motor fuels and electricity production. The deployment of cellulosic biofuels has great potential as a replacement for petroleum-derived fuels. Allowance allocations could help mainstream construction of plants to convert cellulosic materials into both transportation fuels and electricity, and could help farmers accelerate the supply of cellulosic feedstocks. In addition to reducing global warming pollution, an allowance allocation for this purpose would help achieve the president's objective of ending our oil addiction. It would also help the farm sector adjust to agricultural subsidy reforms.

Other renewable energy resources, such as wind and solar, should also be supported by allowances. Wind power is competitive in many markets but still suffers from the on-again-off-again nature of the production tax credit, which inhibits the large scale investment in wind that is needed for it to achieve its potential. A more stable funding incentive would markedly increase wind generation's penetration.

- *RD&D.* A portion of these technology-advancement allowances – perhaps five percent of total allowances – should be dedicated to RD&D into breakthrough

technologies that are not yet ready for broad deployment assistance. This amount would be sufficient to reverse the dangerous decline in RD&D budgets that has occurred over the past decade and a half. A high priority should be given to joint ventures with the private sector putting up half of the research funds. This will help assure that the research is well targeted. In order to replenish the funding for further RD&D, the statute should provide that the publicly chartered entity will receive an equal share in the patent rights for successful technologies developed with these public funds.

It is important to note that most of the allowances distributed in this way would go without cost to the same industries that typically seek other forms of “free” allocation, but they would go in proportion to those industries’ investments in cleaner vehicles and other low-emitting technologies. Distributing allowances this way is far preferable, for example, to allocating allowances on the basis of historical emissions or energy usage.²¹ But there is no reason to limit support for clean energy investments to incumbents only. Rather, Congress should ensure the allowance value is available to *any* firm – incumbent or new entrant – that can efficiently and effectively carry out investments in energy efficiency and clean energy technology.

NRDC supports implementing these incentives by allocation formulas written into the statute, or partly by allocating allowances to a publicly chartered entity such as the Climate Change Credit Corporation proposed under the Climate Stewardship Act. Under a long-term declining cap, these technology incentives would have a much larger and more stable long-term source of funding than will come from the authorizations and tax incentives in the Energy Policy Act of 2005. Furthermore, these incentives could be accomplished without any budgetary impact.

(3) 20% of allowances for transition and adaptation assistance

NRDC supports allocating 20 percent of allowances for a range of transition and adaptation assistance purposes.

A substantial fraction of allowances should be made available to assist workers and communities that are disproportionately impacted by mitigation measures (e.g., coal-miners and coal-mining communities). We support assistance for communities heavily affected by climate impacts, such as Gulf Coast wetland restoration and Alaskan village relocation. Adaptation resources should also be provided to help manage climate change impacts on fish and wildlife and the ecosystems on which they depend. NRDC does not

²¹ If granted free allowances on a historical basis – or on any basis unlinked to making these investments – there is no guarantee that the firms will use allowance value for those purposes. They may distribute the allowance value to shareholders, or invest in other ventures deemed more profitable than retooling to reduce emissions.

pretend to be expert in the best mechanisms for delivering this assistance, but we are eager to work with labor and with leaders of affected communities.

Some have proposed that transition assistance is also needed for energy-intensive industries. We note that energy-intensive electricity and gas consumers would benefit from investments in energy efficiency under part (1) of our proposal. Energy intensive industries could also benefit from allocations made to support big-change technologies under part (2) of our proposal.

As discussed above, NRDC does not support grandfathering allowances to firms that supply or consume highly polluting fuels. Such an allocation would not protect workers in these firms, as it is sometimes claimed, because a grandfathered allocation would allow an energy-intensive firm to shut down its U.S. plants in order to shift production abroad and sell its unused allowances to other sources. Legitimate concerns about the competitiveness of firms that produce internationally-traded energy intensive products should be addressed by other means, such as border tax adjustments or allowance allocations tied to U.S. *employment*. If, however, Congress believes such firms merit some grandfathering of allowances for transitional reasons, this should be tightly limited as discussed above to avoid over-compensation and windfalls.

(4) 5% of allowances to encourage reductions outside the cap, and early reductions, while preserving the cap

NRDC supports setting aside 5 percent of total allowances to encourage emission reduction and sequestration activities by sources that are not covered by the cap, and for early reduction activities. Example activities outside the cap could include soil carbon sequestration by farmers and methane capture at small landfills not covered by EPA regulations.

NRDC strongly supports using a set aside of allowances from within the cap for this purpose rather than to create additional “offset” allowances based on these activities. Establishing appropriate emissions baselines for non-covered sources is an inherently uncertain exercise because it is impossible to observe the emissions that would occur from these sources in the absence of the program. Using allowances from within the cap is a good way to create incentives for beneficial activities without risking the environmental integrity of the emissions cap.

As for early reductions, NRDC does not support giving allowances for “reduction” reports under DOE’s 1605(b) program. First, early emission reductions are their own reward because they position firms to comply with the cap at the lowest possible cost. Careful review of the emission “reductions” reported under the 1605(b) program shows

that most of the reported activities, such as increased output at existing nuclear power plants, were simply business-as-usual actions, and thus deserve no rewards now.²²

If some early reduction credit is nonetheless warranted, then like the treatment of offsets proposed above, the incentive for early action should come out of this fraction of the allowances.

Non-emitting resources and nuclear power

The Committee asked for comment on giving allowances to non-emitting resources, in particular nuclear power.

NRDC believes renewable sources of electricity and liquid fuels are a fundamental part of the solution to global warming. We have suggested that allowances be used to incentivize renewables output under (2), above. Along with other key technologies identified in that section, renewables, carbon capture and disposal, and new automotive technologies offer the promise of becoming economic and competitive in response to early allowance-based incentives.

NRDC does not support using emissions allowances to incentivize nuclear power, however, for several reasons.

First, the nuclear power industry suffers from too many security, safety, and environmental exposure problems, including: Diversion of civilian nuclear programs to nuclear weapons programs; theft and terrorist use of nuclear materials, and the vulnerability of some spent nuclear fuel storage pools to terrorist attack; accidental releases of radioactivity; occupational and public health risks associated with uranium mining and milling; and long-term leakage from underground high-level radioactive waste repositories.

If the nuclear industry satisfactorily addressed these risks, NRDC would not oppose allowing new nuclear generation to compete on a level playing field with other low-carbon energy sources. But NRDC does not believe there is any case for giving nuclear power plants free GHG emissions allowances. NRDC favors more practical, economical, and environmentally sustainable approaches to reducing both U.S. and global carbon emissions, including clean, flexible, renewable energy and efficiency technologies.

²² See <http://www.nrdc.org/globalwarming/fmandatory.asp>

(e) *How should the cap be set (e.g., tons of greenhouse gases emitted, CO₂ intensity)?*

The cap should be set in terms of absolute tons of carbon dioxide-equivalent emitted per year.

All temperature and other impacts relate to the absolute amount of CO₂ and other greenhouse gases that are loaded into the atmosphere. Intensity measures (e.g., tons/\$GDP) do not assure the achievement of any absolute emissions level or carbon loading. While the economy can expand indefinitely (theoretically at least), the atmosphere's size is fixed. The atmosphere cares only about the absolute tonnage of emissions that it must bear.

In addition, carbon intensity measures are inherently deceptive in terms of public communication and understanding. Carbon intensity can improve – indeed almost automatically improves – even as total emissions continue to increase. The present administration has taken advantage of the limited media and popular understanding of the concept of carbon intensity to foster the misperception that their voluntary policies are aimed at reducing emissions, when they are actually intended to allow emissions to keep growing at essentially business as usual.

As explained below, with a long-term declining cap that allows for banking and borrowing, there are significant opportunities for market-based shifting of emission reductions forward or backward in time. An annual emission limit is the anchor for this system.

(f) Where should the cap be set for different years?

NRDC supports a declining emissions cap for U.S. emissions, as explained in response to question 1. To recap:

There is a growing consensus that allowing more than a 2 degree Fahrenheit increase above today's global average temperature would have clearly dangerous consequences.

To retain even a 50-50 chance of preventing average temperatures from rising more than another 2 degrees Fahrenheit in this century, heat-trapping gas and aerosol concentrations need to be stabilized below 450 ppm CO₂-equivalent.

We can stay below 450 ppm CO₂-equivalent if the United States and other industrial nations adopt a declining emissions cap that starts reducing emissions soon and reaches 80 percent below current emission levels by 2050, and if developing countries promptly reduce their emissions growth and follow suit with similar reductions later in the century.

For these reasons, U.S. legislation should provide as follows:

- The mandatory cap should take effect within two years of enactment.
- It should reduce U.S. global warming pollution by at least 15 to 20 percent below current levels by 2020, and reduce emissions on the order of 80 percent by mid-century.
- For each year there should be a regular annual reduction in the cap from the prior year by a specified percentage sufficient to reach the mid-century reduction target. This smooth curve is preferable to having big steps at longer intervals.
- The annual emission reduction rate could start relatively small and accelerate somewhat in later years, as in Figure 1. Care must be taken, however, to require enough reduction in the early years to prevent a crash reduction scenario in the out-years.
- As indicated in Figure 1, the total cumulative emissions under the cap through 2050 should not exceed 68 gigatons of carbon – a level that represents a reasonable U.S. share of a global emissions budget calculated not to exceed 450 ppm CO₂-equivalent.
- Individual firms would have the flexibility to shift their emission reductions backward or forward, depending on their perceptions of the most advantageous investment strategy, through banking and borrowing.

(g) *Which greenhouse gases should be covered?*

The cap should cover all six of the generally-recognized greenhouse gases: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. They should be weighted in terms of carbon dioxide equivalence using generally accepted IPCC estimates of their global warming potential (GWP).

- (h) *Should early reductions be credited? If so, what criteria should be used to determine what is an early reduction?*

The most important consideration in this connection is that the cap-and-trade program should be designed not to *penalize* early action. This is another strong argument against grandfathering allowances based on emissions in a particular base year, because that severely penalizes firms that acted earlier. If firms are unsure whether grandfathering may be used and unsure of what base year may be selected, they may delay reducing emissions to “preserve” their baseline.

In contrast, auctioning allowances, and formulas for allocating them based on future conduct (such as making qualifying technology investments), are means that do not discourage or penalize early action because early action would not reduce a firm’s allocation. Instead, early action reduces the number of allowances a firm needs to acquire.

As discussed above, the Department of Energy 1605(b) program is a completely unsuitable basis for giving early action credits. Few actions recorded there represent action beyond business as usual. There is little or nothing credit-worthy recorded there.²³

If Congress nonetheless determines to award some credit for early actions, it should be from a limited set-aside of allowances from within the cap, as suggested in response to sub-question (d), above. Applications should be reviewed based on objective criteria established by the statute, not based on whether entities had filed reports with pre-existing programs.

²³ See <http://www.nrdc.org/globalwarming/fmandatory.asp>

(i) *Should the program employ a safety valve? If so, at what level?*

A new approach to controlling unexpected costs

Defects of the safety valve. While the cap-and-trade model has worked well for acid rain control, some observers are pushing for a “safety valve” as a safeguard against permit costs exceeding a predetermined level.

The fundamental problem with the safety valve is that it breaks the cap without ever making up for the excess emissions. Simply put, the cap doesn’t decline as needed or, worse, keeps growing. A better approach to cost-control is possible.

“Safety valve” is actually a misleading name. In boiler design, the role of a safety valve is to allow pressures to build within the vessel to working levels, well above atmospheric pressure. A safety valve’s function is to open in the rare occasion when the boiler is pressured beyond its safe operating range, to keep it from exploding. In the life of a well-run boiler, the safety valve may never open.

Imagine, however, a boiler designed with a valve set to open just slightly above normal atmospheric pressure. The valve would always be open, and the boiler would never accomplish any useful work.

That is the problem with the safety valve design in two other proposals advanced by Senator Bingaman and by Representatives Udall and Petri. The valve is set at such a low level that it is intended to be open virtually all the time.

The Energy Information Administration’s analysis of the Bingaman proposal shows that the safety valve would be triggered almost immediately, and emissions would continue to rise through 2030. This is not an acceptable approach.

A safety valve also would prevent U.S. participation in international trading systems. The market price of CO₂ in the European Union’s emissions trading scheme, for example, has already exceeded the U.S. safety valve price proposed in the Bingaman and Udall-Petri proposals. If trading were allowed between the EU and the U.S., a major distortion would occur. European firms (acting directly or through brokers) would seek to purchase U.S. lower-priced allowances. Their demand would almost immediately drive the U.S. allowance price to the safety valve level, triggering the “printing” of more American allowances. European demand for newly-minted U.S. safety valve allowances would continue until the EU price dropped to the same level. The net result would be to flood the world market with far more allowances – and far less emission reduction – than anticipated even under the NCEP recommendations.

Much like other forms of trade barriers, a safety valve distorts the free flow of allowances in an international trading system. A safety valve distorts trade in the same way as when

a country fixes the price of its currency and avoids letting its currency find its appropriate exchange rate based on market forces.

A new approach: borrowing. NRDC has proposed a new approach to controlling unexpected costs. In our estimation, the greatest fear of many in industry is that short-run costs will fluctuate unexpectedly, much as natural gas prices have spiked in recent years. Setting a long-term declining emissions cap opens the door to an innovative way to avoid short-term cost volatility: Firms could be allowed to *borrow* emissions allowances from future years, using them early in times of unexpected cost pressure, and paying them back when short-term spikes recede.

Current legislative proposals already allow firms to make reductions in advance when prices are lower than expected and bank allowances for future use. Borrowing would open the opposite possibility.

Absent borrowing, firms can comply only with current or banked allowances. Allowance prices thus reflect the current marginal cost of compliance, and that price can spike in response to short-term conditions (e.g., a delay in bringing on a new technology, or a surge in economic activity). Borrowing would let firms use emissions allowances from future years, stabilizing prices against unexpected short-term fluctuations. The long-term cap will be maintained, because borrowed allowances will be repaid, with interest, by releasing fewer emissions later when the short-run pressures are relieved. Together, banking and borrowing can stabilize long-term costs and eliminate the risk of price spikes while preserving the environmental integrity of the long-term caps.

The combination of a long-term emissions pathway and borrowing has a clear advantage over the safety valve because it does not break the cap and permanently allow excess emissions. (Proposals allowing unlimited “offsets” – credits for emission reductions not covered by the cap – also have the potential to break the cap if credits are awarded for actions taking place anyway, a problem endemic to past offset programs.)

Legislation to permit borrowing will need to include certain safeguards. First, there needs to be an interest payment pegged to be slightly higher than commercial lending rates in order to discourage businesses from treating allowance-borrowing as a no-interest alternative to regular financing. Second, there need to be appropriate mechanisms to secure repayment and guard against defaults. One option is to limit borrowing to five years in advance, with the option to borrow again if repayments are completed. A second option is to require that borrowers be bonded or otherwise secured against defaults.

- (j) *Should offsets be allowed? If so, what types of offsets? What criteria should govern the types of offsets that would be allowed?*

While many experts and agencies have worked for more than 30 years to produce reliable, workable offset programs in both the clean air and global warming contexts, there is little reason for satisfaction with the results.

Even if often-articulated criteria for measurability and enforceability are met, offsets still have the potential to break the cap because of difficulties in assuring that actions being credited are actually “additional” – i.e., that they are not simply actions that would have taken place anyway in the absence of credit.

The additionality problem is not readily soluble, because it is extraordinarily difficult to devise workable rules for determining business-as-usual baselines at the project level. In some areas, credits may leverage new actions that would not have occurred, with a minimum of credit bestowed on “anyway” actions. But far more often, “anyway” actions make up a large – even dominant – fraction of the reductions credited.

One example was reported in the *New York Times* last year. The reporter wrote:

To check this out for myself, on a rainy afternoon this spring I drove a few hours southwest of Omaha to visit Steve Wiese, a 51-year-old farmer who earns extra money by sequestering carbon on his 2,500-acre farm and selling the carbon allowances on CCX [the Chicago Climate Exchange]. When I arrived, Wiese was going over some paperwork in his barn. On his desk was a check for \$2,008.94. “It just came in the mail the other day,” Wiese said, waving it happily.

Wiese, like hundreds of other farmers who are getting paychecks from carbon emitters by way of CCX, practices a form of cultivation known as no-till. Instead of tearing up the fields each spring and releasing the carbon stored in the soil (mostly in the form of decomposing plant matter and roots), no-till farmers plant right over the previous year's crop, leaving the soil undisturbed.

“How long have you been no-tilling?” I asked him.

“About 14 years,” he said, leaning back in his chair.

“How long have you been getting paid by CCX?”

“Just signed up last year,” he said.

Here was an instance of a major problem that critics of CCX have raised: Wiese is getting paid for storing carbon in his soil, even though he has done nothing to increase the amount of carbon that is being stored on his land – he's just doing

exactly what he's been doing for the last 14 years. A polluter like A.E.P. or Ford can use a credit from Wiese's farm to offset their greenhouse gas emissions, but the fact is, in cases like these the payments from CCX are having no net effect on the level of greenhouse gases in the atmosphere.²⁴

If offsets represent even a small percentage of “anyway” tons, climate protection actually moves backwards. A full ton is added to the cap in exchange for an action that may represent only 0.9 ton of reduction – or worse, 0.1 ton of reduction. With each offset, net emissions increase.

Offsets also can delay key industries' investments in transformative technologies that are necessary to meet the declining cap. For instance, unlimited availability of offsets could lead utilities to build high-emitting coal plants instead of investing in efficiency, renewables, or plants equipped with carbon capture and storage.

At the same time, there are substantial activities outside the cap that may be worth encouraging. For this reason, NRDC has proposed setting aside a portion of the allowances from *within* the cap to incentivize these actions. *See* response to sub-question (d), above. Since the allowances would come from within the cap, they do not run the risk of expanding actual emissions as a result of rewarding this activity. Rather, even if the real reduction achieved by the activity is only 0.9 or even 0.1 ton, net emissions go down as a result of offering allowance to encourage that activity.

Another approach would be to allow only a limited quantity of offsets in the cap-and-trade design, perhaps phasing out after the first decade. Any such offsets must meet rigorous quality criteria, including the best available (even if imperfect) screens for additionality.

The committee should not allow firms to use certified emission reductions under the Clean Development Mechanism without review by the EPA to determine whether they are sound. Significant concerns have been raised recently regarding large numbers of credits derived from retrofitting HCFC-22 production facilities in certain countries with incinerators to burn HFC-23.²⁵ HCFC requirements under the Montreal Protocol are under re-examination and may be strengthened. This may further call into question the HFC-23 destruction credits. NRDC would be happy to pursue this issue with committee staff.

²⁴ J. Goodell, “Capital Pollution Solution?” *New York Times Magazine* (July 30, 2006), <http://select.nytimes.com/search/restricted/article?res=F10D13F63F5B0C738FDDAE0894DE404482>.

²⁵ K. Bradsher, “The Price of Keeping Cool in Asia,” *New York Times* (Feb. 23, 2007), <http://select.nytimes.com/search/restricted/article?res=F70E1EFC3B5A0C708EDDAB0894DF404482>.

- (k) *If an auction or a safety valve is used, what should be done with the revenue from those features?*

As explained under sub-question (i), NRDC opposes inclusion of a safety valve.

If the program includes an auction, NRDC supports using the auction revenues for the four broad purposes and in the percentages proposed in our response to sub-question (d).

- (1) *Are there special features that should be added to encourage technological development?*

NRDC supports using at least a quarter of the allowances to incentivize deployment of the “big change” technologies that are needed to achieve the necessary emission reductions. In addition, at least half of the allowances should be dedicated to reducing consumer costs through investments in energy efficiency. Our proposals are set forth in answer to sub-question (d).

In addition, given the dual need to avoid building new conventional coal-fired power plants and to rapidly expand the market for low-emissions electricity-generating technology, NRDC supports the development of a low-emissions obligation for coal generation, which would require U.S. electricity suppliers to generate a growing portion of their coal-fired electricity using plants that capture and permanently dispose of their CO₂. This approach spreads the costs of deploying carbon capture and disposal technology across the entire fleet of coal-fired power plants, rather than concentrating these costs only on developers of new units.

The standard should be phased in at a rate corresponding to the expected construction of new coal plants plus the gradual replacement of existing obsolete plants over time. To qualify, plants would have to obtain their coal from sources that comply with strict environmental guidelines and would need to have a CO₂ emission rate less than 250 pounds/MWh (which represents an 85 percent to 90 percent reduction compared with a conventional coal plant) as well as state-of-the-art emissions performance for other pollutants. Implementation of the low-emissions coal generation obligation would include a credit trading program, which would allow suppliers that exceed their minimum requirements to bank their extra credits or sell them to suppliers who come up short.

- (m) *Are there design features that would encourage high-emitting developing countries to agree to limits on their greenhouse gas emissions?*

Responsible leadership. The single most important thing the U.S. can do to encourage limits on developing country emissions is to limit our own in the manner proposed here. There is no reasonable chance to engage China, India, and other high-emitting countries absent a clear commitment by the U.S. to curb its own emissions.

The U.S. is still the world's largest annual emitter, and will be the world's largest cumulative emitter for decades to come. U.S. emissions per person are many times higher than in developing countries, and our country has enormous technological know-how, innovative capacity, and investment resources. These are reasons why it is reasonable and necessary for the U.S. to take action, and these are reasons why our actions would facilitate engagement by key developing countries. Simply put, they will remain skeptical and reluctant as long as they see this country doing nothing and pointing fingers.

Trading opportunity. A cap-and-trade system can also encourage these countries to take on targets for key sectors and, eventually, their total national emissions. Cap-and-trade legislation should allow for linking with other countries that have national or sectoral targets, including developing countries that adopt targets that reduce their emissions growth in the early period and later provide for reductions similar to our own.

International trading could then deliver triple benefits:

- Global warming risks would be reduced as more countries adopted emissions pathways consistent with avoiding more than a 2 degree temperature increase.
- U.S. firms would benefit from the widest opportunities to reduce emissions cost-effectively through direct investments and through international emissions allowance trading.
- Developing countries would obtain access to new sources of capital to spur cleaner, more sustainable development, reduce their contribution to global warming, and meet important domestic objectives such as curbing local pollution.

Border tax adjustments. Other mechanisms are available to spur developing country participation and protect U.S. firms from disadvantage in case such participation is delayed. For example, border tax adjustments could be levied on imports produced in a country that lacks appropriate global warming limits. The WTO permits border tax adjustments to counter unfair trade advantages due to the absence of appropriate pollution controls in the exporting country. If a domestic cap-and-trade program provided for imposing such adjustments, developing countries would have an additional reason to agree to appropriate actions.

The one thing the U.S. program should *not* do is condition our own action on first achieving formal agreements with developing countries. That would put U.S. policy in the hands of the Chinese or Indian governments. It would also be seen as finger-pointing by the largest emitter with the most capability to act. That would only set back progress towards international agreements.

Appendix to Question 2: Allocation to Electricity Distribution Companies

To the extent that any emission allowances are allocated to the electricity industry, rather than auctioned, NRDC recommends that distribution companies receive these allowances rather than generators for the reasons set out below.

Why allocate to distribution companies?

The problem with allocating allowances to generators is rooted in equity concerns: about 40 percent of US generation sells its output at market prices into various largely unregulated wholesale markets, while the rest remains subject to diverse forms of cost-of-service price regulation.²⁶ Impacts of allocations on consumers and shareholders will vary widely and state regulators will not be able to respond to real or perceived inequities. Generators can be expected to pass through the increased price of carbon regulation in their wholesale prices, and also to keep the proceeds from the sale of allowances allocated to them initially. Consumers obviously will see the price signal, but not the benefits from the allowance allocation. The problem has already surfaced in European markets, leading United Kingdom authorities to conclude that initial allocation to electric generators serving competitive markets resulted in large windfall profits.²⁷

Electricity distribution companies, by contrast, provide service under continuous price regulation from either state commissions (for investor-owned utilities, accounting for about three-fourths of retail sales) or local boards (for publicly owned utilities and cooperatives, which serve the rest of the nation). The regulators can ensure that the value of these allowances is used for designated public purposes, including energy efficiency programs and rate adjustments. Both most of the utility industry and its regulators are likely to prefer this alternative strongly to a generator-based system (e.g., see Exelon's comments on Senator Bingaman's White Paper²⁸).

How would allocations to distribution companies be calculated?

Congress would have a wide range of options in making allocations, ranging from the carbon content of electricity delivered by distribution companies to the volumes of electricity delivered (with numerous intermediate compromise possibilities). Utilities that distribute mostly coal-fired electricity are likely to advocate an emissions-based formula on the grounds that they will see the largest increase in electricity costs as a result of the CO₂ emissions cap. Utilities that distribute mostly low-emission resources are likely to

²⁶ This is the estimate of the Electric Power Supply Association, which represents competitive power suppliers.

²⁷ House of Commons, Environmental Audit Committee, "The International Problem of Climate Change: UK Leadership in the G8 and EU," p. 17 (Mar. 16, 2005).

²⁸ John W. Rowe, Response to Question 2. Allowance Allocation. Available from http://energy.senate.gov/public/index.cfm?FuseAction=Conferences.Detail&Event_id=4&Month=4&Year=2006

advocate a formula based on electricity sales on the grounds that their customers are already paying higher prices for a cleaner generation portfolio.

Whether or not the allocations should be updated over time is an independent question. A phase out of any free allocations to the private sector diminishes the case for updating in general (the more rapid the phase out the less need to update the free allocation). Any allocation based on carbon content should definitely not be updated because that would create a perverse incentive to increase emissions in order to obtain a larger allocation, raising the overall cost of achieving the emission cap (or increasing actual emissions if the safety valve is open). There is a better argument for updating a sales-based formula as a matter of equity between high-growth and low-growth areas. Such an approach would need to include an adjustment for independently verified energy efficiency to ensure that updating does not create a disincentive for additional energy efficiency improvements.

The simplest approach would be to allocate based on electricity sales during the same historical period used for allocating to other sectors. If Congress decides to allocate (in part or in whole) based on historical emissions, however, calculating the carbon content of those electricity sales is certainly feasible and should not be seen as an obstacle to allocating to distribution companies. As long as the allocation is to distribution companies (to avoid windfall profits) and is not updated in a way that creates perverse incentives (to avoid raising costs or emissions) then the specific allocation formula is a matter of regional equity and an appropriate subject for negotiations during the legislative process.

What would prevent state regulators from masking price signals to consumers through their regulation of distribution companies? This is theoretically possible under any system of allocation, of course, given regulators' ultimate control of key elements of retail electricity pricing in every region of the country. It would be appropriate for Congress to condition the grant of free allowances on a requirement that a portion be used to promote energy efficiency and that they not be used to mask the cost of carbon emissions in the form of directly offsetting subsidies for retail electricity costs.

Of course, once trading in emissions allowances begins, state regulators cannot change or hide a very potent price signal, which is the added cost of carbon-intensive generation to its utility purchasers (and to other entities that buy power in wholesale markets to serve retail customers). This is the most important economic element of any cap-and-trade system for the generation sector, because it shapes the long-term investment and operational decisions that drive the sector's total emissions. Carbon-intensive generation will increase in price to these decision-makers as the cap takes effect and tightens, regardless of how retail-price regulators decide to deal with proceeds from the sales of allowances allocated initially to their distribution companies.

3. *How well do you believe existing authorities permitting or compelling voluntary or mandatory actions are functioning? What lessons do you think can be learned from existing voluntary or mandatory programs?*

Voluntary programs aren't adequate

The first *lesson* of voluntary programs to control greenhouse gases is that, as a whole, they have been ineffective in significantly slowing the steady growth of U.S. emissions. No serious environmental problem has been solved by voluntary action alone.

As discussed above, NRDC has documented the failures of the administration's voluntary approaches.²⁹ A new book from Resources for the Future, *Reality Check*, also concludes that voluntary programs can't be relied on for substantial reductions.³⁰

Mandatory programs

The time has come for a mandatory cap-and-trade program, accompanied by mandatory performance standards and incentives. We have more than 40 years of experience in the U.S. and other countries to establish that mandatory programs deliver results.

The best-known mandatory cap-and-trade program is the U.S. acid rain program. This program has cost-effectively cut sulfur dioxide emissions in the United States. It functions smoothly, with greater certainty and lower administrative costs for both government and business than many other pollution control programs. As discussed above, the acid rain program needs some modification to be adapted to global warming, especially in its emissions allowance allocation system. It is, however, a strong model for action against global warming pollution.

The international and domestic market-based program for phasing out ozone-depleting chemicals is another success story.

Abroad, the EU emissions trading scheme is working effectively to reduce global warming pollution across Europe. We can learn important lessons from the EU system about the windfalls and overallocation that came from a grandfathering approach to emissions allowance distribution in the system's trial year. Those problems are well on the way to being solved.

More generally, the emissions trading market among parties to the Kyoto Protocol is likely to function as envisioned during the compliance period of 2008-2012. Whatever

²⁹ See <http://www.nrdc.org/globalwarming/fmandatory.asp>

³⁰ R.Morgenstern & W. Pizer (eds.), *Reality Check: The Nature and Performance of Voluntary Environmental Programs in the United States, Europe, and Japan* (Resources for the Future, Washington, 2007).

concerns there may be regarding the Protocol, its basic cap-and-trade architecture is sound.

Turning to performance standards, the U.S. has decades of experience with mandatory performance standards for facilities and products. There are many important lessons to learn in the design of such standards, including the importance of basing them on objective measures of performance (e.g., emissions or energy consumption) wherever feasible.

In short, we have the regulatory know-how to mobilize the technological know-how to solve the global warming problem.

4. *How should potential mandatory domestic requirements be integrated with future obligations the United States may assume under the 1992 United Nations Framework Convention on Climate Change? In particular, how should any U.S. domestic regime be timed relative to any international obligations? Should adoption of mandatory domestic requirements be conditioned upon assumption of specific responsibilities by developed nations?*

In our judgment, U.S. adoption of a mandatory cap-and-trade program is essential to unlock progress with developing countries. The single most important thing the U.S. can do to encourage limits on developing country emissions is to limit our own in the manner proposed here. There is no reasonable chance to engage China, India, and other high-emitting countries absent a clear commitment by the U.S. to curb its own emissions. On the other hand, once that commitment is made, opportunities will open to engage those countries on sectoral and national emission reduction commitments consistent with the global objective of limiting concentrations to 450 CO₂-equivalent and avoiding more than another 2 degrees F of warming.

The U.S. is still the world's largest annual emitter, and will be the world's largest cumulative emitter for decades to come. U.S. emissions per person are many times higher than in developing countries, and our country has enormous technological know-how, innovative capacity, and investment resources. These are reasons why it is reasonable and necessary for the U.S. to take action, and these are reasons why our actions would facilitate engagement by key developing countries. Simply put, they will remain skeptical and reluctant as long as they see this country doing nothing and pointing fingers.

Trading opportunity. Adopting a domestic cap-and-trade system will encourage these countries to take on targets for key sectors and, eventually, their total national emissions. Cap-and-trade legislation should allow for linking with other countries that have national or sectoral targets, including developing countries that adopt targets that reduce their emissions growth in the early period and later provide for reductions similar to our own.

International trading could then deliver triple benefits:

- Global warming risks would be reduced as more countries adopted emissions pathways consistent with avoiding more than a 2 degree temperature increase.
- U.S. firms would benefit from the widest opportunities to reduce emissions cost-effectively through direct investments and through international emissions allowance trading.
- Developing countries would obtain access to new sources of capital to spur cleaner, more sustainable development, reduce their contribution to global warming, and meet important domestic objectives such as curbing local pollution.

United States should *not* condition its own emission reductions on prior agreements by other countries. Other mechanisms are available to spur developing country participation and protect U.S. firms from disadvantage in case such participation is delayed.

For example, border tax adjustments could be levied on imports produced in a country that lacks appropriate global warming limits. The WTO permits border tax adjustments to counter unfair trade advantages due to the absence of appropriate pollution controls in the exporting country. If a domestic cap-and-trade program provided for imposing such adjustments, developing countries would have an additional reason to agree to appropriate actions.

Conditioning our own action on first achieving formal agreements with developing countries would put U.S. policy in the hands of the Chinese or Indian governments. It would also be seen as finger-pointing by the largest emitter with the most capability to act. That would only set back progress towards international agreements.

International forums. Legislation should take care not to tie prospects for progress exclusively to the UN Framework Convention on Climate Change (UNFCCC). In 2005, for example, Prime Minister Blair created a G8-plus-5 forum, bringing together the principal industrial nations with five big and rapidly growing developing countries – China, India, Brazil, Mexico, and South Africa. These industrial and developing countries are responsible for a large majority of total world emissions. A smaller group of large emitters may be a more productive negotiating forum than the 190+ country forum of the UNFCCC.

President Bush has formed a smaller grouping excluding Europe, called the Asia-Pacific Partnership, consisting of the U.S., Australia, Japan, China, India, and South Korea. While this group includes some of the world's largest emitters, it has not resulted in any meaningful progress because the President has limited the terms of engagement to purely voluntary activities. Under a different mandate, that could be a more productive forum, or it could be merged with the G8-plus-5.

The point is that domestic legislation should not assume or lock in any one forum as the place where progress on global warming must be made.